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ABSTRACT

Screened for psychiatric, neurologic, perceptual, psychologic, and educational deficits were 168 New York City first graders; and provided was an intervention program for 29 children judged to be perceptually handicapped, Socioeconomic and racial data showed Ss to be 79% white, 12% black, 9% oriental; and 23% of the sample to be from Spanish speaking homes. Intelligence levels followed the average distribution curve. Twelve percent of the children showed symptoms of emotional decompensation, while 25% were considered well adjusted, and the remaining 66% showed mild or moderate symptoms of emotional stress. Seventy to eighty percent of the children had difficulty with finger-gnossis, right-left discrimination, and synkinesis in the neurological examination. The intervention group was selected by the following criteria: presence of perceptual deviations in spatial and temporal organization, evidence that cerebral dominance for language was not yet established, and poor fine motor coordination. The intervention group tended to cluster in the lower socioeconomic groups; to show some degree of psychiatric impairment and to have low initial reading scores. Readministration of educational tests at the end of the first grade revealed that the children in the intervention group were indistinguishable in their reading achievement from the total first grade. The study indicated the effectiveness of integrating the skills of a medical center with those of the public schools. The study was replicated the following year with similar findings. (DB)

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PROFILE OF A FIRST GRADE:

A BASIS FOR PREVENTIVE PSYCHIATRY*

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PROFILE OF A FIRST GRADE:
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Archie A. Silver, M.D. and Rosa A. Hagin, Ph.D.*

In an attempt to detect children with potential emotional and cognitive disability and to treat them before their symptoms hardened into learning failure and into emotional decompensation, an interdisciplinary team from the Preventive Psychiatry

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The authors acknowledge with gratitude the assistance of the following staff members of the Learning Disorders Laboratory: Juan Fiks, M.D., Adele Lieber, M.D., Henrietta Kreeger, M.A., Elizabeth Scully, M.A., Marie Margenau, M.A., Hilda Ornitz, Ph.D., and Carol Corwin, B.A. This paper also would not be possible without the cooperation of the staff of P.S. 116, Manhattan.

Unit of New York University Medical Center examined every child in the first grades of a public school in the Lower East Side of New York City during the academic years 1969-70 and 1970-71. We chose first grade because it is here that the child's cognitive skills begin to focus on reading, here that we can, with reasonable certainty, predict which child will have difficulty in learning to read and here where we can still interrupt the destructive influence of cognitive disability on emotional development.

The examination involved individual psychiatric, neurological, perceptual, psychological, and educational evaluation of each child. Details of these examinations will be described below, each in its appropriate section. Results of these examinations should tell us the nature and extent of emotional problems, neurological deviations, and perceptual defects for the entire first grade, and so supply firm data for school planning and detailed information for appropriate intervention for each child. For the child with cognitive problems, intervention has taken place within the school, in a resource room staffed jointly by our Unit and by the public school, in a program of training based upon procedures previously developed and tested by our Unit (Silver et al., 1967). Experience with these procedures has shown that for the child with learning problems, improvement in cognitive function provides a strong point around which the developing personality may rally. Mild

and moderate emotional symptoms accompanying cognitive defect may thus be treated without the need for further psychotherapeutic help. "It is no longer feasible," says Biber (1961), "to dichotomize the learning functions and the process of personality formation" (p. 323).

This paper will describe the general characteristics of the first grades, detail methods of psychiatric, neurological, and perceptual evaluation, describe the findings of such examinations and the results of intervention as seen in school achievement.

(1) General Characteristics

This study includes 2 population samples, the entire first grade of 1969-70 of a public school on the Lower East Side of Manhattan numbering 86 children (44 girls, 42 boys), and the entire first grade of the same school in 1970-71 numbering 82 children (41 girls, 41 boys). The 1970-71 first grade was studied not only because the detection and intervention program started in 1969 was to be continued in the school, but also to test the replicability of results obtained in the 1969-70 group. Statistical study of the variability of the means of 20 variables including initial reading, spelling, scores of impairment on neurological and psychiatric examinations, perceptual tests in visual, auditory, haptic, and

intermodal areas, general characteristic such as age and language spoken in the home, revealed no significant differences on any of these except on a visual motor test (Koppitz score of the Bender), a test of auditory sequencing (each significant at the .05 level) and a learned rote language test (days of the week, significant at the .01 level). Comparison of results on all other variables confirmed the replicability of the 1969-70 data (Figure 1). Accordingly, the following discussion will focus primarily on the 1969-70 group, bringing in the 1970-71 children if differences in details occur or to increase the size of our sample.

The 86 children of 1969-70 were a fairly stable group, with 8 children moving out and 2 moving into the district during the school year. Their ages range from 5 years, 8 months to 7 years, 8 months, and with 50 percent of the children between ages 6 1/2 to 7 years. Ethnic background included 79 percent white, 12 percent black, 9 percent oriental. Their socioeconomic levels varied from 21 percent of our population in Group I of the United States Census levels (professional and technical) and 51 percent in Groups V, VI, and VII (service workers and laborers). This compares with 13 percent (Group I) and 20 percent (Groups V, VI, VII) in the United States Census 1960 distribution.

For 46 children (slightly more than half), English is the major language spoken at home, in 22 (28 percent Spanish, Chinese in 6, German in 2, Swahili 3, and one each speaking Nepalese, Estonian, Maltese, and Armenian.

Study of intellectual function, as measured by the Wechsler Preschool & Primary Scale, revealed a range for the Full Scale IQ from 58 to 130 with a mean of 97.3, standard deviation 15.91. Performance scores yielded a mean of 99.16 with a standard deviation of 15.47; Verbal scores were more widely dispersed and with a lower mean, 96.65, standard deviation 17.06.

Examination of the 86 children in 1969-70 revealed that 29 (more than 1/3) have evidence of perceptual immaturity deemed sufficient to require specific perceptual training and language stimulation, 8 already had emotional symptoms severe enough to require treatment, 4 were functioning at a defective intellectual level (below 70 on the WPPSI), 3 had peripheral sensory defects requiring correction. Of this group, only 2 were known to mental hygiene clinics, the Bureau of Child Guidance or to social agencies. Of the 82 children examined in 1970-71, 27 (again more than 1/3) have evidence of perceptual immaturity requiring intervention and 8 are emotionally decompensated.

Criteria for selecting those children for intervention were: (1) perceptual immaturity, with respect to the child's age and intelligence, in those functions relating to spatial and temporal organization; (2) evidence that cerebral dominance for language has not yet been established; (3) deviations in praxic ability and in fine motor coordination. While these are basic criteria for intervention, a few children newly arrived from Puerto Rico and Hong Kong, retarded in language, whose cultural experiences have not exposed them to English, were accepted for a short period of language stimulation. Our experience has been that, unlike children with perceptual problems, these children will make rapid progress with appropriate language stimulation. Our reasons for considering these basic criteria stem from our observation that children with developmental language disability invariably have the stamp of a specific perceptual defect (Silver and Hagin, 1960), and that even in adult life the remnants of these defects may be recognized (Silver and Hagin, 1964; Weiss et al., 1971). Their detection is possible at the very beginning of first grade, actually even earlier. Their elimination by appropriate methods of training is possible thus bringing the brain to the point of maturity where the child is able to learn to read in his classroom by more conventional methods.

The 29 children selected for intervention in 1969-70, and 27 in 1970-71, came from every age group (Figure 2), paralleling the curve of the age distribution for the total group; and came from varied ethnic background. Fifteen of the 29 had English as the major language spoken at home; 11, Spanish as a major language. Their socioeconomic background also varied, however, with a clustering at the lower level and a decreased percent at the highest (Figure 3). Their intelligence test scores range from 70 to 130 on the WPPSI, but tend to be drawn from those with Full Scale IQ less than 100 (Figure 4). This skewing to the lower scores is particularly marked on the Performance Scale (Figure 5, 6). A detailed analysis of the WPPSI scores appears elsewhere (Hagin et al., 1971).

The perceptual deviations found, therefore, are not simply a function of age, sex, intelligence, or socioeconomic background. They are, however, found in proportionately higher numbers in those from the lower socioeconomic levels.

(2) Psychiatric Evaluation

Psychiatric status was evaluated in individual interviews by a child psychiatrist. Approximately 1/2 of the total 1969-70 group and approximately 1/3 of the 1970-71 group were also evaluated separately by a second examiner and the results

compared. The problem was twofold: (1) the identification of those children in a normal population who could be considered vulnerable to emotional decompensation; and (2) the development of a systematic evaluation which could be recorded, and could be replicated. These problems are not unique to this study (Flapan and Neubauer, 1970; GAP Report #63, 1966). What symptoms, in a 6 and 7 year old, for example, could be assigned pathological significance and/or predictive value? What stress should be put on teacher assessment of the child's behavior and his academic achievement? Previous studies (Ullman, 1952; Glidewell et al., 1957; Bower, 1960; Werry and Quay, 1971) have all indicated the validity of teacher ratings in detecting children with behavioral and educational deviation. Teacher ratings have limitations, however (Goldfarb, 1963), as do computerized questionnaires (Spitzer and Endicott, 1971).

Because our purpose was to be aware of intrapsychic problems and developmental trends, in addition to behavior and achievement, our method was the clinical interview, open-ended and flexible. Our object was to survey such psychological functions as affect, object relations, impulse control, reality testing, identification, defense patterns, including somatic fixations and repressions, thought processes, behavior in various settings, and

character traits. Criteria for each of these functions were evolved. For example, object relations are described as interested with little anxiety, infantile, withdrawn, suspicious, aggressive, seductive; affect as depressed, hypomanic, labile, and appropriate. We should then have a statistical picture of the ego functions of this first grade, and how each child conforms to these statistical norms.

Study of the distribution of symptoms (Figure 7) reveals that by the time a child reaches first grade (ages 6-7 years), he has a capacity to distinguish reality from fantasy (90 percent), his identifications have become at least outwardly established (80 percent), and introjection-projection mechanisms, in the sense of clinical introjections and hallucinations, are no longer usual (80 percent). On the other hand, deviations in affect and object relations, impulse control, as well as somatic complaints, fears, and obsessions and compulsions are found in from 40-50 percent of all children examined.

The ability to relate to a relatively strange adult in his school is still an uneasy task for 50 percent of the children. They react in an infantile way with much oral activity (fingers in mouth, chewing on pencil, biting at clothes, demanding food), or by a closed-mouth, anxious withdrawal, or by aggressive, sometimes clowning behavior.

Many appear depressed, although this may be their reaction to the initial anxiety of a new situation. Impulse control may be difficult with an innibited, rigid, overcontrolled posture or restless motor outbursts, becoming hyperkinetic in 10 percent of all children examined. Almost all children in this group when specifically asked, express fears of ghosts, of monsters, of animals like lions, dinosaurs, and gorillas. With half of these, however, asking about fears arouses anxiety with further elaboration about monsters eating children, about robbers killing, of death and dying, of a devil who will "stick him in a fire, cook him and eat him," of witches who can "turn you into anything," of parents or siblings being killed, of the house falling down or burning. Obsessional thinking is expressed by many (28 percent). This largely concerns recurrent thinking about sickness and injury to parents, siblings, and themselves. A surprising number (23 percent) go into rituals, such as need to check doors and windows, look under beds and in closets before going to bed, check gas jets. Introjections, usually of a "bad voice" or "God's voice," appear in 5 percent; 11 percent had auditory hallucinations of God or the devil talking to them, or of their mother's voice reassuring them.

The fate of these symptoms, which if found in a clinic patient would probably be considered as signs of disturbance, should be determined by follow-up examinations.

In addition to the statistical picture, however, a clinical judgment of overall psychiatric impairment was made. Here, too, criteria were established. An attempt was made to parallel the rating scale used by Langner et al. (1969) in their study of a random sample of Manhattan children between the ages of 6 and 18 years. Our scale was also a 5-point rating scale with the following criteria:

0. No disability: Affect and object relations appropriate. Reality testing and impulse control good. Identification appropriate, neurotic-like symptoms limited to occasional fears of ghosts and monsters, but which did not appear to influence the child's functioning. Thought process coherent and relevant; behavior not deviant. Relationships with parents and peers show little stress. Anxiety mild and reactive.

   Example A: Margaret, 6 years, 2 months of age; IQ V. 110, P. 105, F.S. 109. Neatly dressed, comes into examining room with interest and curiosity, shy at start, relates easily and without anxiety, relaxed in motor activity, talks freely and relevantly, pleased to be a girl, admits fears of death,

but not obsessively concernod, does not worry about parents' health, describes God as being in her and in "everyone and everywhere," no reality breaks, behavior in school described as cooperative, friendly.

(1) Mild impairment: Affect, object relations, and reality testing appropriate, occasional break in impulse control with occasional outbursts or withdrawal. Neurotic-like symptoms include fears beyond those of ghosts and monsters with obsessive anxiety concerning parents and his own health. Thought process coherent and relevant. Behavior occasionally aggressive or withdrawn. Relationship with parents showing mild stress. Anxiety mild and still reactive.

Example B: Daniel, age 6-5, IQ V. 96, P. 99, F.S. 97. Pale child, normal in size. Friendly and interested, but hypokinetic in posture, becoming more rigid as his family and home is discussed, occasional outbursts of aggression at father, fear of fires, rats, and roaches, feels that his building might collapse and that he or his parents will be in accidents. Thinking coherent and relevant, complains of "stomachaches." Family situation chaotic.

(2) Moderate impairment: Affect occasionally depressed, with little apparent external provocation, possible lability of mood. Object relations infantile or suspicious or guarded. Reality testing intact. Occasional breaks in impulse control. Neurotic-like symptoms established with phobias, occasional auditory hallucination of the reassurance variety or someone calling his name. Tendency to somatic regressions and fixations. Thought process occasionally circumstantial. Behavior occasionally aggressive or withdrawn. Relations with parents stressful. Behavior occasionally disruptive.

Example C: Mark, 6 years, 10 months, IQ V. 107, P. 108, F.S. 109. Depressed and anxious, restless, suspicious. Fears of houses falling and of flying, describes dreams of a submarine crashing into him and cutting his belly open, feels he is being watched and that the teachers and his classmates do not like him, feels he is a bad person and will be punished, suffers from asthma.

(3) Severe impairment: Affect may be inappropriate, object relations suspicious and paranoid, but could be infantile and clinging. Reality testing occasionally

blurred. Identification not clearly established. Neurotic-like symptoms definite including obsessions, compulsions, projection and possibly introjection. Somatic regression and fixations frequent. Behavior unpredictable. Parents complain about his behavior. Character already deviate.

Example D: Jorge, 6 years, 2 months, IQ V. 96, P. 80, F.S. 96. Marked anxiety, with fears of separating from mother and later from teacher, becomes clinging and infantile, perseverative, negativistic, hyperkinetic. Attention span very short. He is evasive, his speech is rambling and disconnected, impossible to follow with disconnected fragments about cars hitting him, his hitting the cars. He bits and tears at his shirt sleeve and wrist. Parents report sleep disturbance, constipation. Spanish-speaking home.

(4) Overtly psychotic.

It is recognized that this rating scale may be subject to the important error of assigning pathological significance to symptoms and behavior borrowed from the clinic, and that in reality many of these symptoms may be transitory (Kanner, 1960). It also

permits an unavoidable subjective element. The scale does serve the purpose, however, of categorizing or grouping symptoms and affords a base line for follow-up examination.

Using this gross rating scale, 19 (23 percent) of the 1969-70 group are without psychiatric symptoms, 25 (31 percent) mild, 29 (36 percent) moderate, and 8 (10 percent) classified as severe. Comparative figures for 1970-71 group reveal 24 (30 percent) without symptoms, 26 (35 percent) mild, 20 (25 percent) moderate, and 8 (10 percent) severe (Figure 8). For the 10 percent severe, it is no longer a matter of prevention, it is the treatment of an already established illness. The finding of 10 percent with severe impairment compares with 12 percent found by Langner et al. (1969) in their random sample of 1034 children between the ages of 6 to 18 years living on the East Side of Manhattan between Houston and 125th Street. The similarity between their findings obtained by questionnaire interview of the mothers and our finding obtained by clinical examination is striking. Glidewell et al. (1951) by reports from teachers of 91 "school children" found 6 percent disturbed, "has or is likely to have serious problems"; Lapouse et al.

(1964) and Lapouse (1965, 1966) found 18 percent of 477 children with problems in 4 areas of personal behavior. Bower (1960) found 4.4 percent of 5500 elementary school children from 75 school districts to be "emotionally handicapped" as reported by 200 teachers.

This study finds an average of 25 percent of the children to be considered well-adjusted as against 12 percent of Langner's group. Another 1/3 are considered by us to have mild symptoms, and about 30 percent moderate symptoms. The 25-30 percent with moderate symptoms are considered most vulnerable to emotional decompensation. Children with mild and moderate psychiatric impairment comprise the major portion of the intervention group. Two of those children considered severely impaired were hospitalized.

(3) Neurological & Perceptual Examination

Neurological examination included not only the classical examination of cranial nerves, muscle tone, power, and synergy, deep and superficial reflexes and gross sensory status, but also an evaluation of the so-called "soft" neurological signs, such as postural responses, and of the "higher cortical func-

tions" (Luria, 1966), perception in all modalities, spatial orientation of right and left, finger-gnosis, praxis, and the establishment of cerebral dominance for language. The examination for "soft" neurological signs, and their influence on developing personality, has long ago been described by Bender (1956), and has been utilized in the diagnosis of "minimal brain damage" (Strauss and Lehtinen, 1947), a term which has more recently given way to the designation "minimal cerebral dysfunction" (Clements, 1966).

Our examination of perception, a part of the neurological examination, is primarily concerned with the development of spatial and temporal organization. Perceptual ability is tested in the visual, auditory, haptic, intermodal, and body image areas. In the visual area, we are concerned with discrimination, recall, figure-ground perception, and visual motor ability; in the auditory area, with auditory discrimination, sequencing of sounds, of words, and of rote sequences. Haptic perception includes the recognition of forms of different spatial configuration. Intermodal testing involves an auditory-verbal test and an auditory-graphic test. Right-left discrimination, praxis, and finger-gnosis is considered in body image. For each of these tests, a graph of cumulative frequency was drawn so that a child's score on each test could be translated into a percentile rank in our population

sample. As indicated above, with the exception of the Koppitz score on the visual-motor test (Bender, 1956), the auditory sequencing test, and the rote sequencing test, scores for the 1969-70 group did not differ significantly from those of the 1970-71 group so that graphs of cumulative frequency are virtually identical (Figure 1). With the exceptions noted above, therefore, our perceptual tests appear to be reliable for the 6-7-year-old first-grader in this particular school. Their use is being extended upward to the 7-8-year-old (second grade) and downward to the 5-6-year-old (kindergarten).

A composite picture of the distribution of perceptual ability in this group may be seen from Figure 9, where a numerical score of total perceptual ability is obtained[1] for each child; the lower the score, the better the total performance. Scores thus range from 0-27 with 50 percent

[1]Each percentile rank is arbitrarily assigned a value as follows: 50 percentile and above = 0; 49-35 = 1; 34-20 = 2; 19-5 = 3; 4 or less = 4. A score designating the percentile rank is obtained for each perceptual test for each child. These are then added to yield a numerical score of total perceptual ability for each child.

of the total group at 4. Of the 29 children in the intervention group, however, only 5 have scores that low. The 50th percentile of the intervention group is at a score of 11. All children scoring in the lower quartile are thus included in the educational intervention program. This is to be expected since one of the criteria for inclusion in the intervention group is perceptual deviation. An analysis of group results for each perceptual function is the subject of a separate communication.

For any individual child, however, it is now possible to set up a profile of his perceptual skills relative to his peers. Myra, for example (Figure 10), functions better than the 50 percentile in all perceptual tests. If we consider her expectancy to be a function of age and intelligence, then with an IQ in the average range, she is functioning as well or better than expectancy. This is a perceptually normal child. Diana (Figure 11), on the other hand, with the same overall intellectual level and at approximately the same age, earns scores below expectancy level on tests of visual recall, visual figure-ground perception, visual-motor function, visual sequencing, and in auditory discrimination. Richard (Figure 12) illustrates the ability of our perceptual battery to isolate discrete areas of poor function in a child with generally intact perceptual apparatus.

Karl (Figure 13) with better than average expectancy, has a profound and diffuse cognitive problem.

Of the total neurological evaluation including classical neurological examination, "soft" neurological signs, the extension test for cerebral dominance, praxis, right-left discrimination, and finger-gnosis deviations from the normal have been rated in accordance with the following criteria:

0 = Minimal deviations: No perceptual deviations below expectancy, errors in right-left discrimination limited to the mirror image, finger-gnosis errors only in asymmetric double simultaneous stimulation.

1 = Mild deviations: Include perceptual deviations in one or more areas, but not greater than 25 percent below expectancy; errors in right-left discrimination in self and in examiner, in finger-gnosis, and in the establishment of cerebral dominance.

2 = Moderate deviations: Include all the above except that perceptual defects are greater than 25 percent below expectancy, and that there are, in addition, problems with fine motor coordination and praxis. Muscle tone may be abnormal and postural reflexes immature.

3 = Severe deviations: Include all the above but in addition there are definite signs on classical neurological examination. These signs may include: cranial nerve signs, poor gross motor coordination, equilibrium difficulty, and difficulty with control of gross motor impulses.

4 = Clear-cut neurological disease: As cerebral palsy, Turner's syndrome, gross aphasia.

With this scale, approximately 44 percent of the combined first grades of 1969-70 and 1970-71 have minimal deviations, 34 percent mild, 14 percent moderate, 7 percent severe, and 1 percent demonstrating a clear-cut cerebral palsy (Figure 14). Approximately 1/3 of the total group received educational intervention; these children encompassed all those with severe deviations and most of those with moderate deviations.

As we review individual neurological functions (Figure 15, Profile of Neurologic Function), all functions except finger-gnosis, right-left discrimination, and synkinesis have matured to that point where 60-75 percent of the total group show no deviations. This maturation is seen in cranial nerves, muscle tone, fine and gross motor coordination, kinetic pattern, postural responses, and in

praxis. The presence of abnormality in any of these areas, together with specific perceptual deviations beyond that expected for the intelligence of the child, suggests a significant deviation in maturation. The presence of synkinesis at this age, difficulty with right-left discrimination in the mirrored image, and errors in finger-gnosis involving asymmetrical bilateral simultaneous stimulation, by contrast are seen in 70-85 percent of children and so should not in themselves be considered a deviation in function, but within the bounds of normal maturation. This is in general agreement with the findings of Benton (1959). A surprising finding was what seemed to be a high incidence of cranial nerve abnormality. Most of these could be accounted for by nystagmus, frequently accompanied by eccentric pupils. As part of our examination, ophthalmological consultation was supplied by Dr. Jean Smith of the New York University Medical Center. Examination of visual acuity, eye muscle balance, and stereopsis was done on all children in our population sample. Findings on neurological examination concerning nystagmus were confirmed. The cause of the nystagmus is not clearly understood.

The question arises as to how many children with mild or even moderate deviations are really displaying neurophysiological immaturity and will mature as time goes on.

The problem, however, is that these maturational lags will most certainly create difficulty in learning when neurological and perceptual maturation do not keep pace with the educational requirement of first grade. Further, in the absence of specific stimulation, spontaneous maturation may not occur. Some children may indeed compensate for their deviations, but at cost to their total adjustment. Moderate or severe deviations have a tenacious quality causing continual interference with learning and making emotional adjustment precarious.

A closer examination of the intervention group to attempt diagnostic grouping was done. A total of 29 children of the 86 first graders of 1969-70 were selected for intervention. Their ages, ethnic, socioeconomic background, and intelligence test scores have been described above. Twenty-seven of the group are considered to have psychiatric impairment; 25 have mild to severe neurologic deviations. Thirteen children fit into the category of a developmental language disability. This includes specific perceptual deviations in spatial and temporal organization, evidence that cerebral dominance for language is not yet established, $\pm$ praxic immaturity, all this with intelligence and educational experience adequate for learning and with no evidence for structural defect of the central

nervous system or of the peripheral sensory apparatus. It is thus a diagnosis of exclusion and inclusion. Where their perceptual defects are trained out, their prognosis is excellent. Possible causative factors of this syndrome are discussed by Whitsell and Silver, 1970.

An additional 12 children have the basic syndrome described above, but in addition have deviations in one or more areas of neurological examination; in cranial nerves (other than nystagmus), muscle tone, power or synergy, gross and fine motor coordination, equilibrium, deep and superficial reflexes. For descriptive purposes, these children have been classified as organic. How many of these represent structural insult to the brain is not known. (Bax and MacKeith, 1963; Work and Holden, 1966; Whitsell and Silver, 1970). Some may indeed represent more severe developmental lags than included in the developmental language disability syndrome, but some (6 of the 12 in this group) have signs strongly suggestive of structural defect of the central nervous system, diffuse and non-progressive, present at birth or before birth. Stephen, as an example of this group, age 6 years, 2 months, with Full Scale IQ of 115 (Verbal 115, Performance 115) has a grossly spastic gait. He has nystagmus and ocular convergence difficulty. His muscle tone is increased with

cog-wheeling in the upper extremities. His deep reflexes are increased with bilateral ankle clonus.

A third group, consisting of 6 children, fit into neither category. These children present a non-specific type of immaturity. They are physically small, immature in appearance, with head circumference at about 19 inches, with a uniformly low curve of maturation. In all aspects of gross and fine motor function, and in all aspects of language and social awareness, they seem 1 to 2 years retarded. They do not, however, have signs suggestive of structural brain damage. Study of blood and urine in 3 of these children revealed no abnormal metabolites.

Practically, these distinctions are helpful in management. Treatment is progressively more difficult from developmental, to organic, to generalized immaturity.

RESULTS OF INTERVENTION

In the fall of 1969, the oral reading scores of the intervention group, clustered into the lowest segment of total class scores (Figure 16). By the spring of 1970 the curve of distribution of oral reading scores resembled that of the total group, with 2 stragglers still reading just below first grade (Figure 17). By the spring of 1971, the distribution of reading scores of the intervention group was

indistinguishable from that of the total group, with a range from grade .9 to grade 5.6 (Figure 17). In the spring of 1971, too, it was possible to do a retrospective control study, comparing the 1970-71 second graders (children we worked with when they were first graders) with the 1969-70 second grade (Figure 18), children with whom we had no contact. The group picture shows we have managed to intervene with the low-scoring children at no cost to the high achievers. Statistical indications are seen from movement of median of 2.3 in control group to 2.8 in the experimental group.

SUMMARY AND CONCLUSIONS

Children numbering 168, all in the first grade of a public school in the Lower East Side of New York, 86 of whom were in the first grade of 1969-70, 82 in the first grade of 1970-71, were examined individually psychiatrically, neurologically, perceptually, psychologically, and educationally to detect children with potential emotional and cognitive disability and to treat them before their symptoms hardened into educational failure and emotional decompensation. With the exception of 3 tests of perception (Koppitz score of the Bender-Gestalt, auditory discrimination, and auditory

code sequencing), all results of 1969-70 do not appear to differ from those of 1970-71 and suggest the similarity of the groups on those measures and the replicability of the tests. The children ranged in age from 5 years, 7 months to 7 years, 8 months, with the median in the 6 year-6th month-7 year-0 month range. There were 79 percent white, 12 percent black, and 9 percent oriental; they come from a wide range of socioeconomic and cultural backgrounds. Spanish is spoken in the homes of 23 percent and their overall intellectual functioning, as measured by the Wechsler Preschool & Primary Scale, falls roughly within the average distribution curve.

In evaluating a range of ego functions during psychiatric examination, we found that 12 percent of the total group already had symptoms suggesting emotional decompensation. On the other hand, 25 percent were considered well-adjusted. The remaining approximately 2/3 have mild and moderate symptoms which indicate emotional stress, compensated but vulnerable. Eighty to 90 percent of first grade children can distinguish reality from fantasy; identifications have become at least outwardly established; and clinical evidence of introjection and hallucination are not found. Deviations in affect, object relations, impulse control, somatic symptoms, fears, and ritualistic thinking

are found in 40 to 50 percent.

Perceptual study involved assessment of spatial and temporal organization in the visual, auditory, haptic, intermodal, and body image modalities. Cumulative frequency graphs gave the percentile rank of each child's score on each test. Distribution of the sum of the scores for the total group yields a median of 4; for those children selected for intervention, the median was 11.

Neurological study including the so-called "soft" neurological signs and study of praxis, right-left discrimination, and finger-gnosis, revealed that while 44 percent of the first graders had minimal deviations, 34 percent had mild, 14 percent moderate, and 7 percent severe deviations. By the age of 6 to 7 years, 60-75 percent of the total group had matured in all functions except finger-gnosis, right-left discrimination, and synkinesis. In these 3 functions, 70-85 percent of the children have difficulty with the tests given.

As a result of the testing, 29 children of the 1969-70 group and 27 from the 1970-71 group were selected to receive training based upon the specific deviations uncovered. The criteria for selection were the presence of perceptual deviations in spatial and temporal organization, evidence that cerebral dominance for language was not yet established,

with or without deviations in praxic ability, and in fine motor coordination. The intervention group was drawn from all ages, all ethnic backgrounds and all socioeconomic groups. They tended to cluster in the lower socioeconomic groups, and all but 7 of the 66 were considered to have some degree of psychiatric impairment. They numbered approximately 1/3 of all children in their class.

Readministration of educational tests revealed that by the spring of 1970, as a group, the children selected for intervention in 1969-70 were now indistinguishable in their reading achievement from the total first grade. By the end of second grade, this pace was still maintained by the intervention group, and by the spring of 1971 the reading scores of the 1969-70 first graders were now superior to those of previous second graders in the school.

The study reported here describes segments of our experience in the first two years of a continuing project in the integration of the skills of a medical center with those of the public schools. It has demonstrated the feasibility of intensive cross-sectional study of children in the first grade, and the use of data so obtained to help the school teach the children more effectively.

Methods have been described for the psychiatric, neurological, and perceptual study of the normal 6 to 7-year-old. These methods appear reliable and replicable.

Results of these examinations have implications for preventive psychiatry.

The finding that 12 percent of this "normal" population was already emotionally decompensated imposes an obligation to locate these children and to treat them. For those children considered mildly or moderately impaired in emotional functioning and in behavior, theoretical considerations as to the meaning of these symptoms arise. Are these "normal" adjustments without significant pathological implications? Or are criteria derived from the clinic applicable to these "normal" children? If these indeed represent pathological deviations, then we have the task of altering the environment and organizing total resources in a program of preventive psychiatry. Follow-up study of these children is needed to supply some of the answers to these questions.

The neurological and perceptual findings suggest that a high percentage of children, approximately 1/3 of the sample, have perceptual deviations which have been found to be associated with school learning problems. Are these, too, normal variations within the distributions of human abilities? Or is there some special vulnerability in these functionings relating to the acquisition of language? Our experience has led us to the latter point of view. The

results of intervention appear to confirm its validity. It is also apparent that the first grade is not too late for the introduction of preventive programs.

Our results further suggest that perceptual deviations are so numerous that the needs of these children cannot be met through isolated programs or special classes, but that provision for them must be incorporated throughout the educational system.

Figure 1

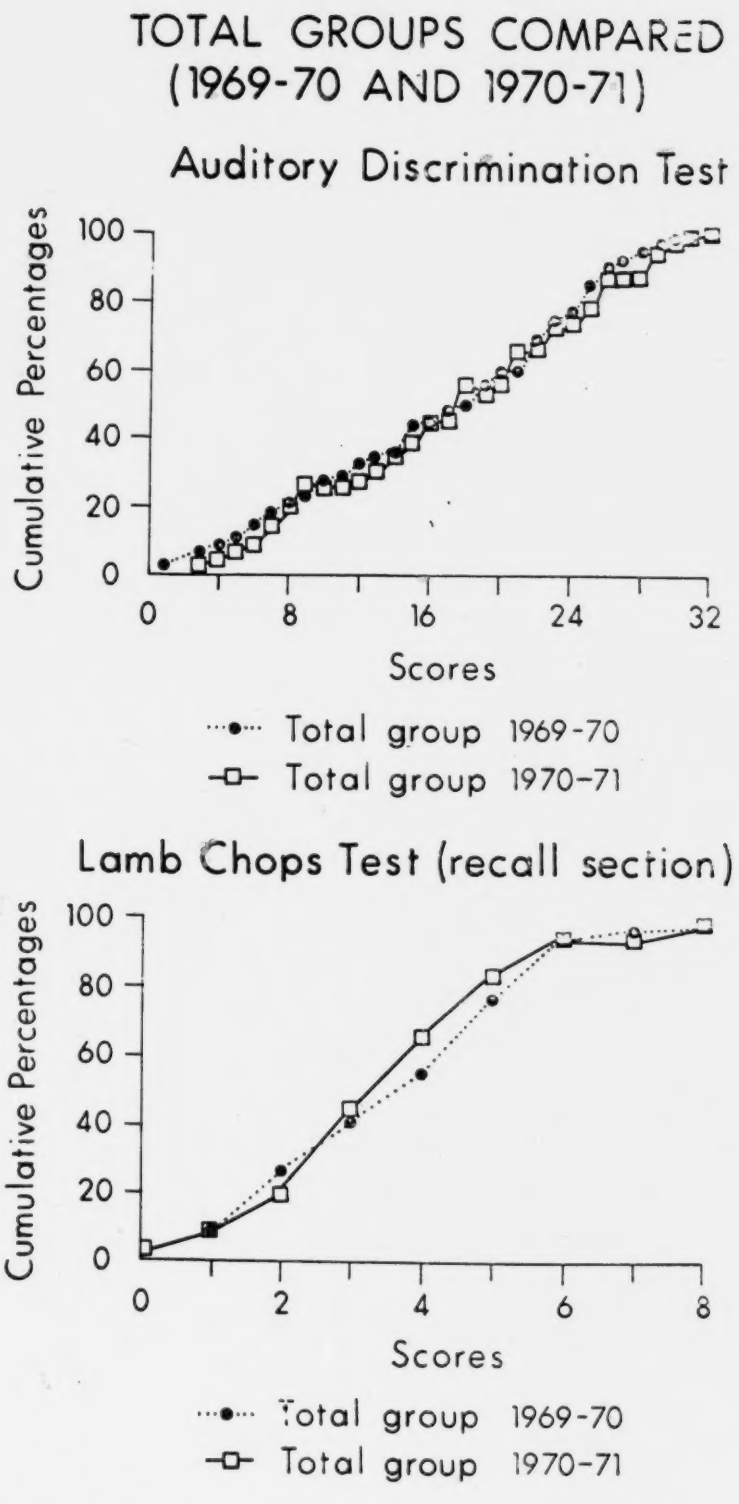

TOTAL GROUPS COMPARED
(1969-70 AND 1970-71)
Auditory Discrimination Test
Cumulative Percentages
100
80
60
40
20
0
0
8
16
24
32
Scores
Total group 1969-70
Total group 1970-71
Lamb Chops Test (recall section)
Cumulative Percentages
100
80
60
40
20
0
0
2
4
6
8
Scores
Total group 1969-70
Total group 1970-71

Figure 2

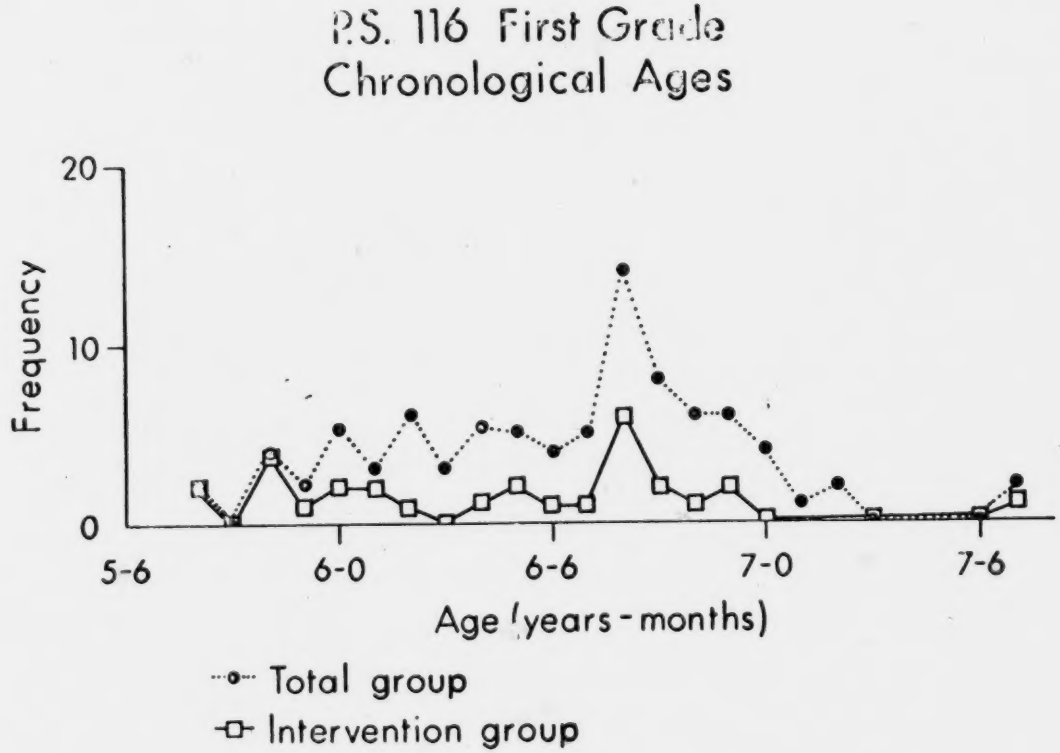

P.S. 116 First Grade
Chronological Ages
20
10
0
Frequency
5-6
6-0
6-6
7-0
7-6
Age (years - months)
Total group
Intervention group

Figure 3

P.S. 116 COOPERATIVE PROJECT

(1969-70 First Grade)

SOCIOECONOMIC STATUS

Census Categories	Total Group		Intervention Group	
I Professional and Technical	21%		8%	
II Managers, Proprietors, and Officials, Owners, Farm Managers	13%		8%	
III Clerical and Salesmen	4%		0%	
IV Craftsmen, Foremen, Operatives	11%		8%	
V Service Workers, Public and Private	31%	48%	46%	68%
VI Laborers, Farm, and Non Farm	17%		22%	
VII Welfare	3%		8%	

Figure 4

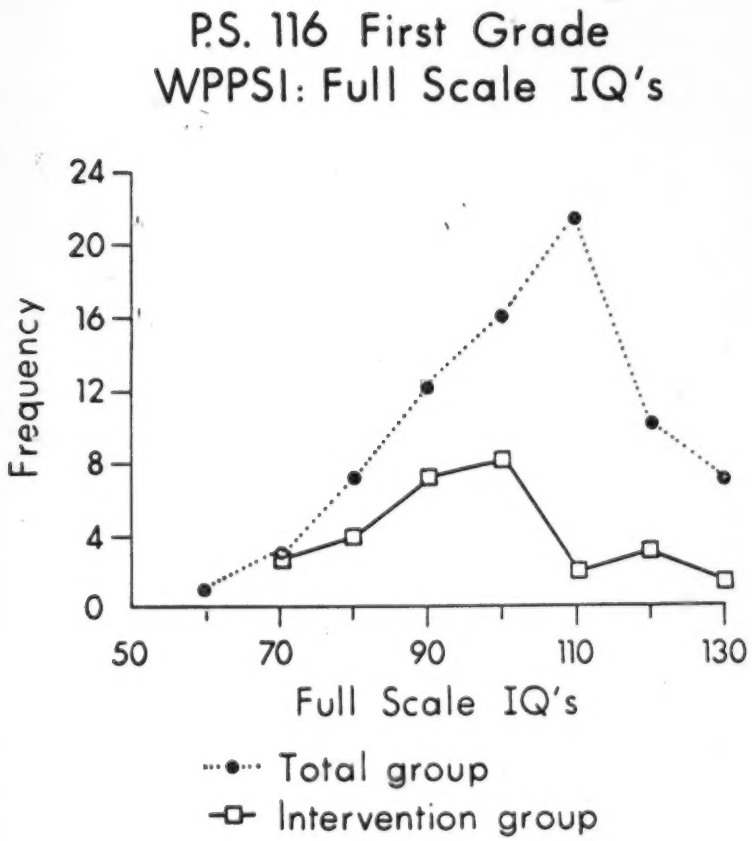

P.S. 116 First Grade
WPPSI: Full Scale IQ's
Frequency
24
20
16
12
8
4
0
50
70
90
110
130
Full Scale IQ's
Total group
Intervention group

Figure 5

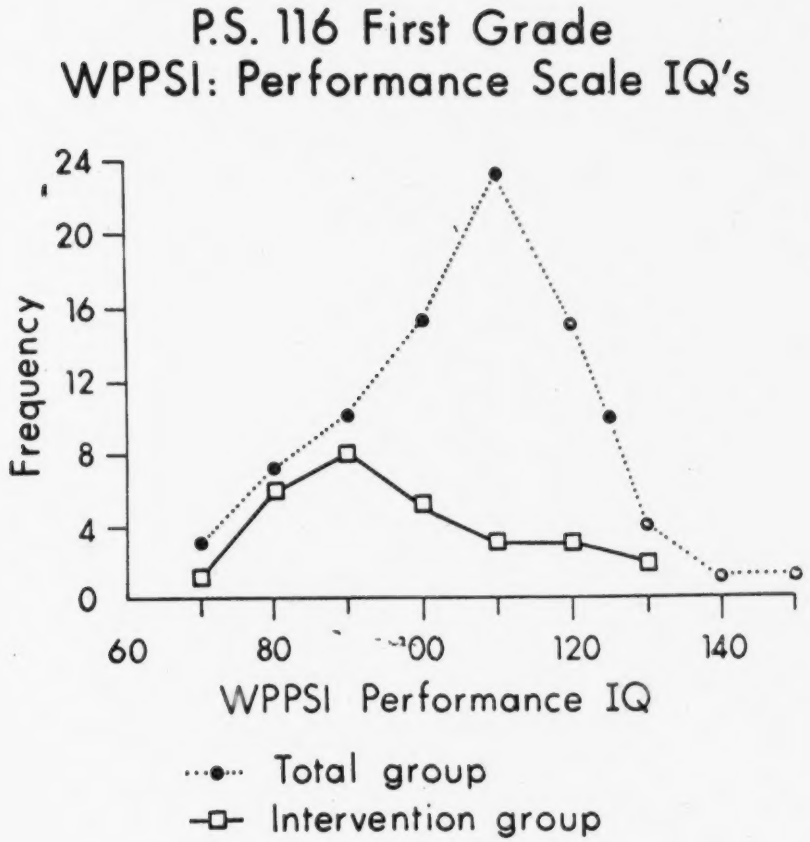

P.S. 116 First Grade
WPPSI: Performance Scale IQ's
Frequency
24
20
16
12
8
4
0
60
80
100
120
140
WPPSI Performance IQ
Total group
Intervention group

Figure 6

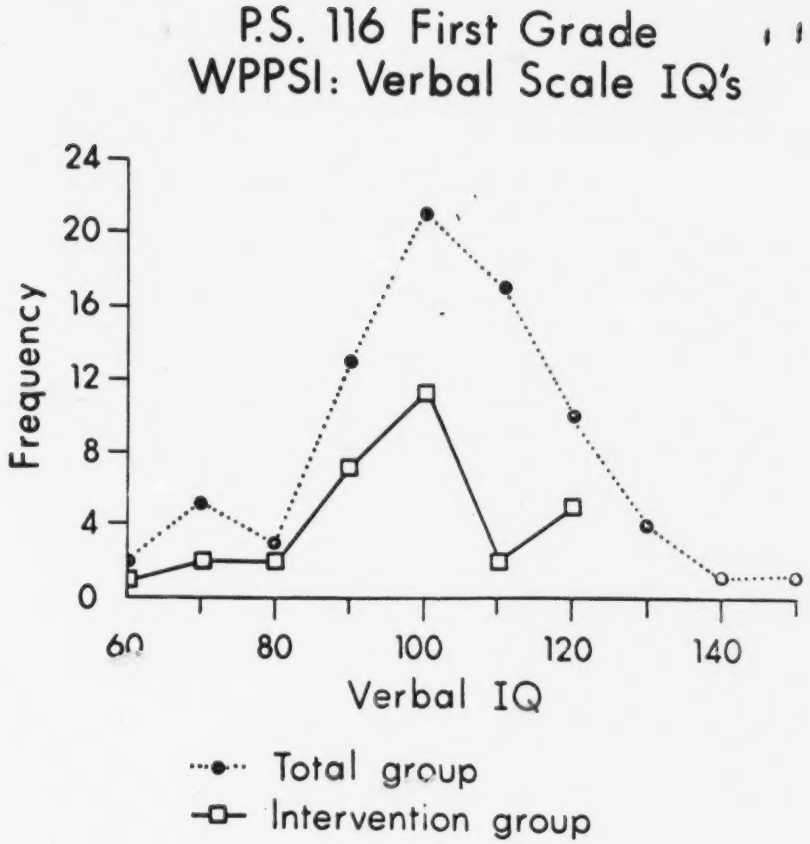

P.S. 116 First Grade
WPPSI: Verbal Scale IQ's
Frequency
24
20
16
12
8
4
0
60
80
100
120
140
Verbal IQ
Total group
Intervention group

Figure 7

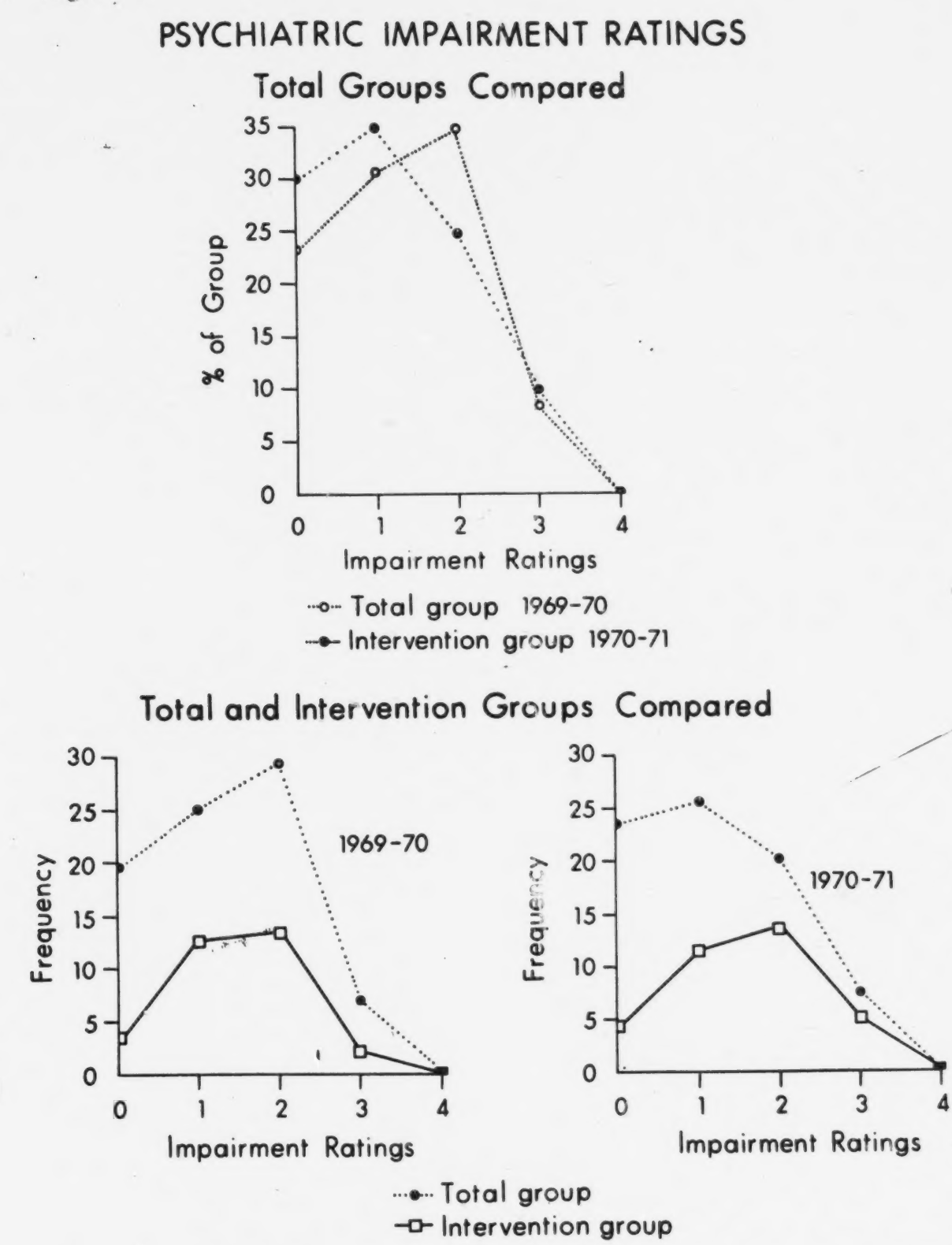

PSYCHIATRIC IMPAIRMENT RATINGS
Total Groups Compared
% of Group
35
30
25
20
15
10
5
0
0 1 2 3 4
Impairment Ratings
Total group 1969-70
Intervention group 1970-71
Total and Intervention Groups Compared
Frequency
30
25
20
15
10
5
0
1969-70
0 1 2 3 4
Impairment Ratings
1970-71
Total group
Intervention group

Figure 8

PROFILE OF PSYCHOLOGICAL FUNCTIONS

Total Group: 1969-70 and 1970-71 *

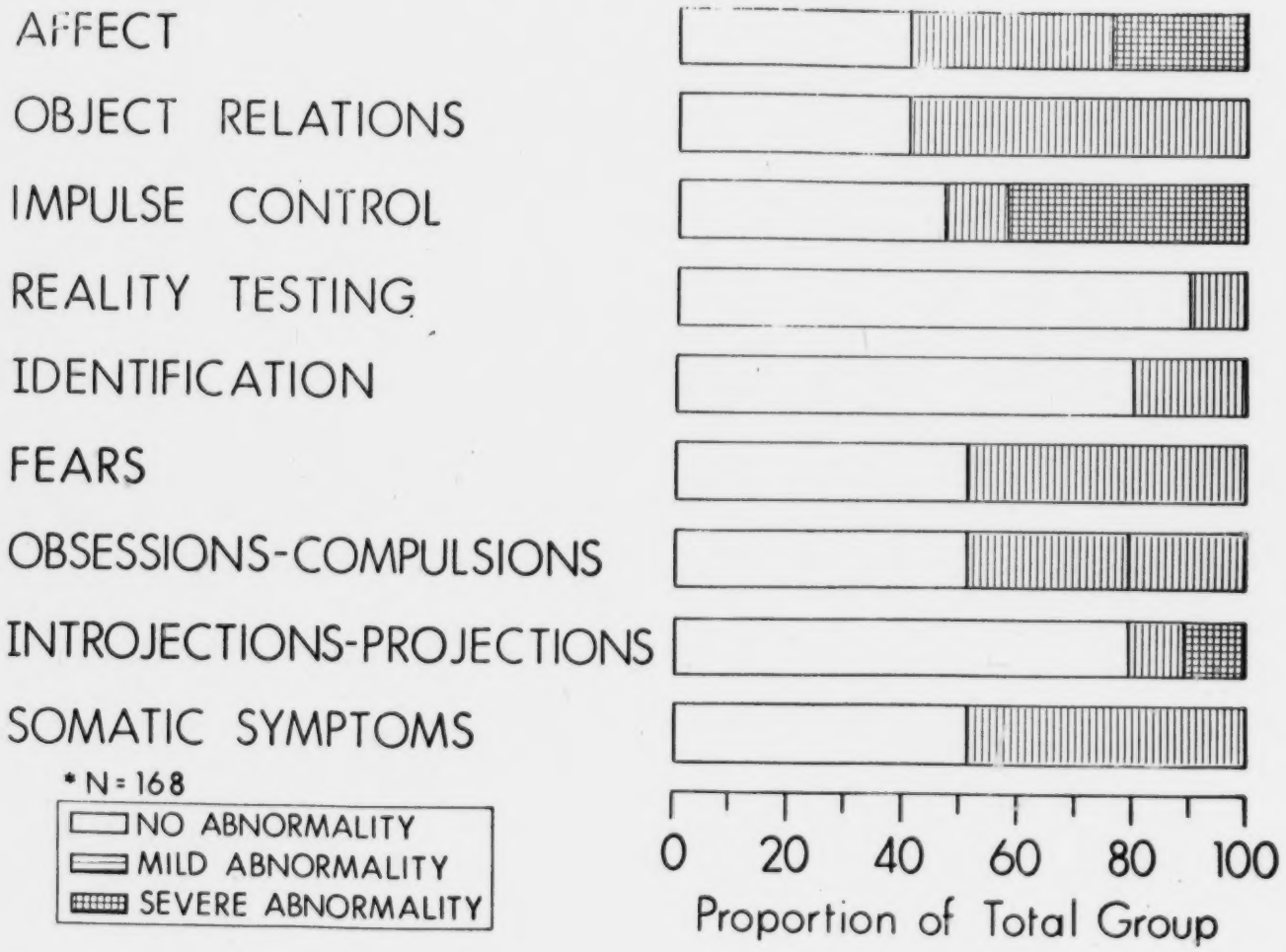


Figure 9

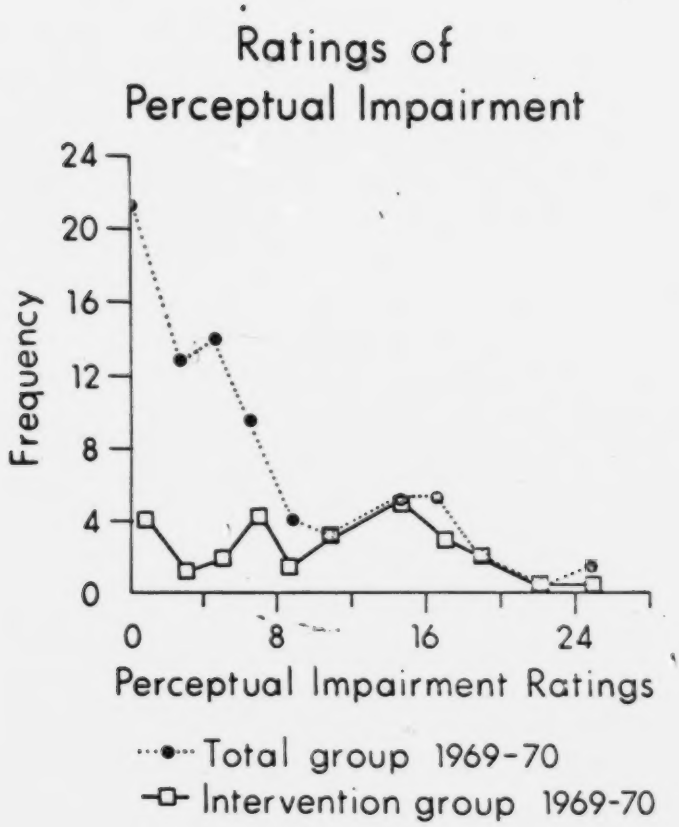

Ratings of
Perceptual Impairment
Frequency
24
20
16
12
8
4
0
0
8
16
24
Perceptual Impairment Ratings
Total group 1969-70
Intervention group 1969-70

Figure 10

LRU-116 PERCEPTUAL BATTERY:
Search Scale
Intensive Scale

NAME Myra AGE 6-8 BIRTHDATE 1963-5 GRADE 1

DATE 1-18-70 OR 1.3 SP 1.2

WPPSI/WISC ____ VIQ 94 PIQ 104 FSIQ 99 EXPEC 48%ile

DIAGNOSTIC CODE Normal Range

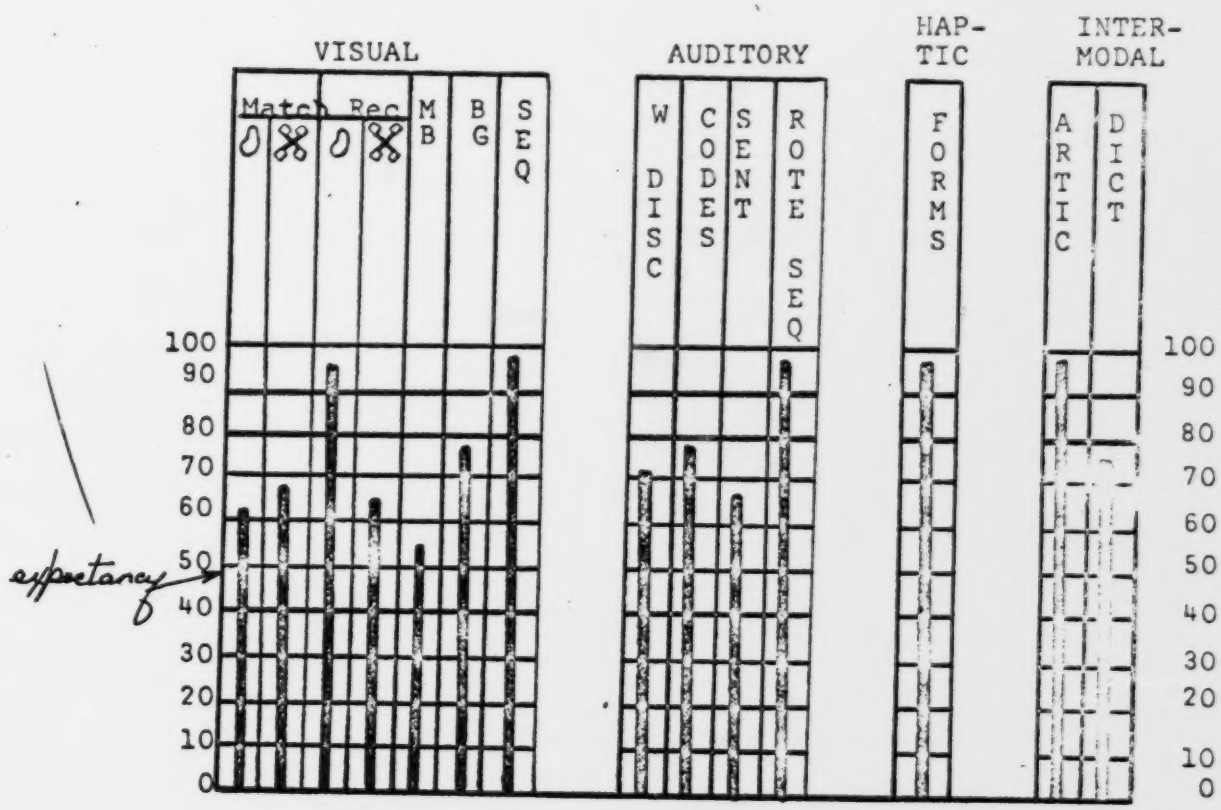


Figure 11

LRU-116 PERCEPTUAL BATTERY:
Search Scale
Intensive Scale

NAME Diane AGE 6-7 BIRTHDATE 1963-2 GRADE 1

DATE 9-29-69 R 0.3 SP 0.8

WPPSI/WISC ____ VIQ 101 PIQ 96 FSIQ 99 EXPEC 48%ile

DIAGNOSTIC CODE SLD

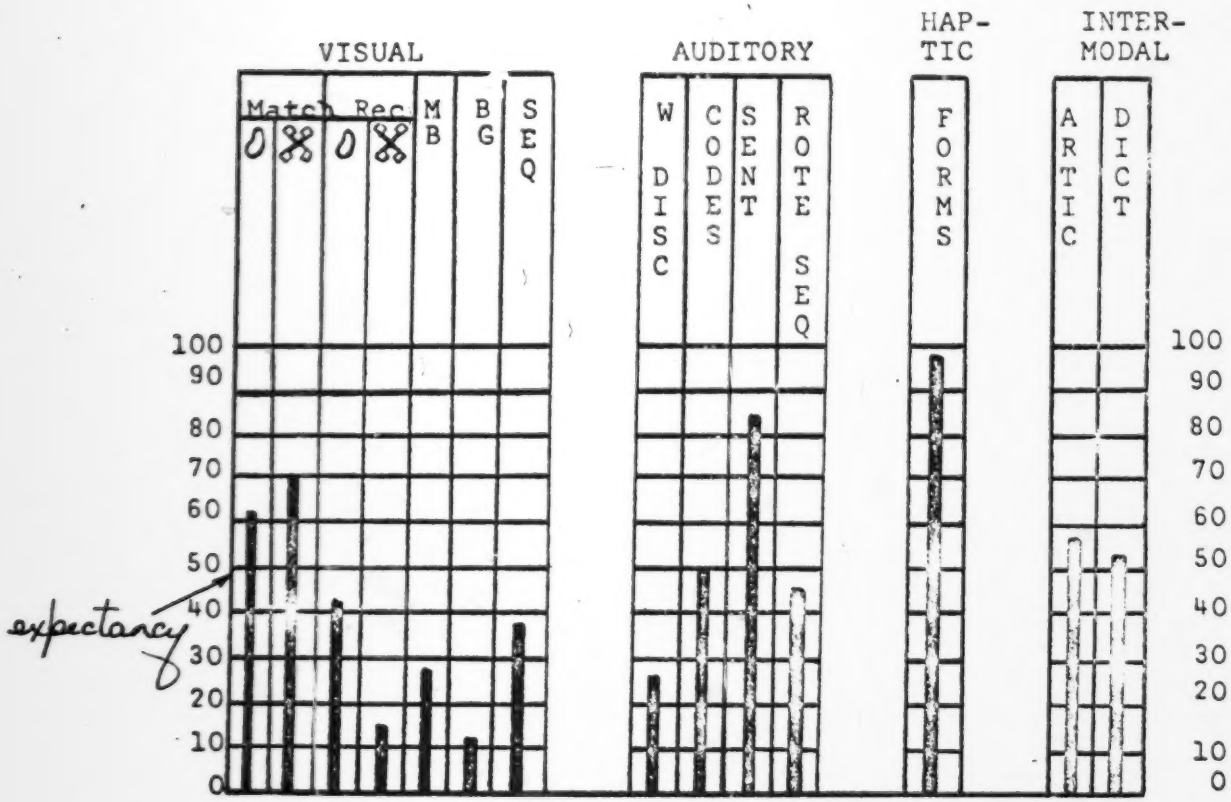


Figure 12

LRU-116 PERCEPTUAL BATTERY:
Search Scale
Intensive Scale

NAME Richard AGE 6-5 BIRTHDATE 1963-4 GRADE 1

DATE 9-29-69 PR 1.2 SP 0.8

WPPSI/WISC ____ VIQ 87 PIQ 110 FSIQ 98 EXPEC FSIQ 45%ile PIQ 75%ile

DIAGNOSTIC CODE SLD

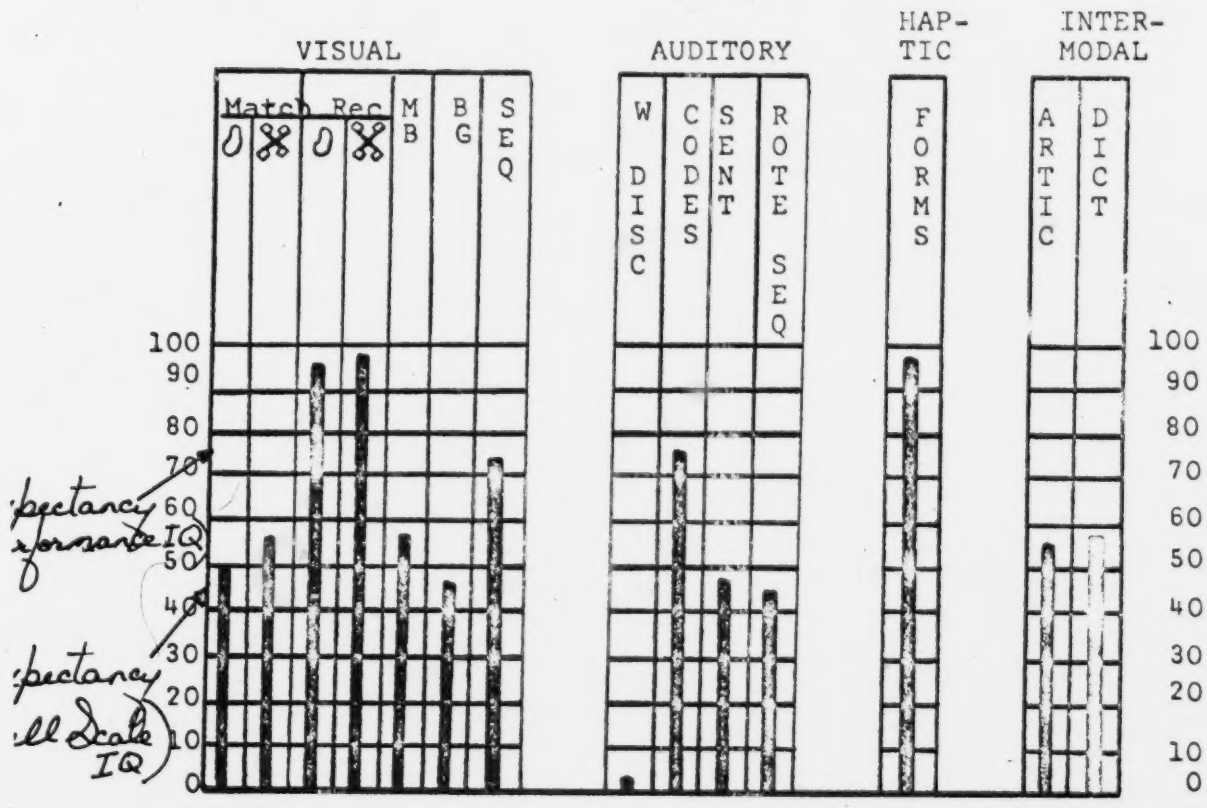


Figure 13

LRU-116 PERCEPTUAL BATTERY:
Search Scale
Intensive Scale

NAME Karl AGE 5-10 BIRTHDATE 1963-11 GRADE 1

DATE 8-10-69 OR 0.9 SP 0.1

WPPSI/WISC ____ VIQ 106 PIQ 112 FSIQ 110 EXPEC 75%ile

DIAGNOSTIC CODE 0

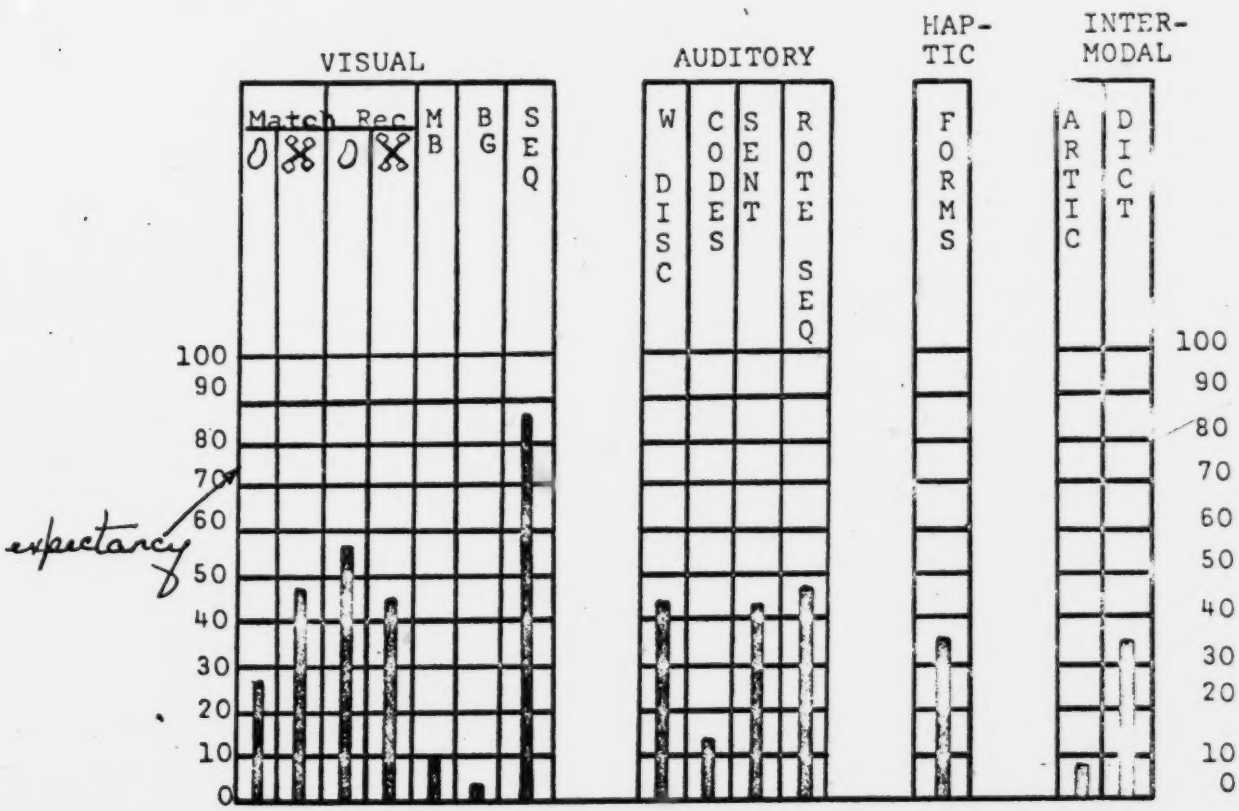
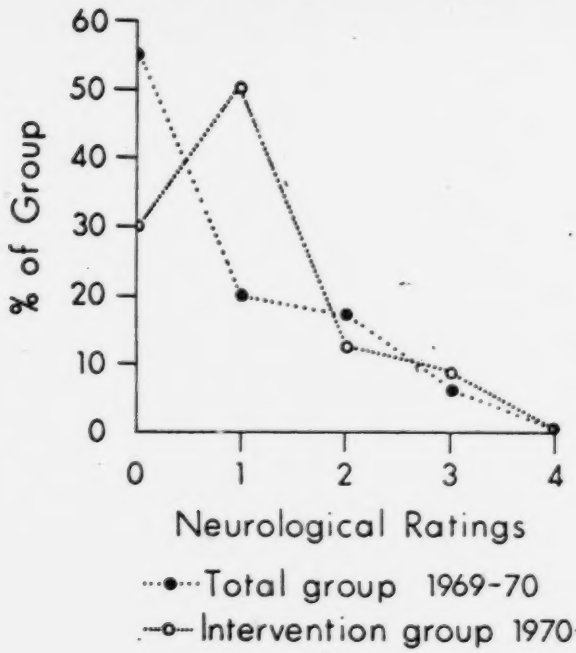


Figure 14

NEUROLOGICAL IMPAIRMENT RATINGS

Total Groups Compared



Total and Intervention Groups Compared

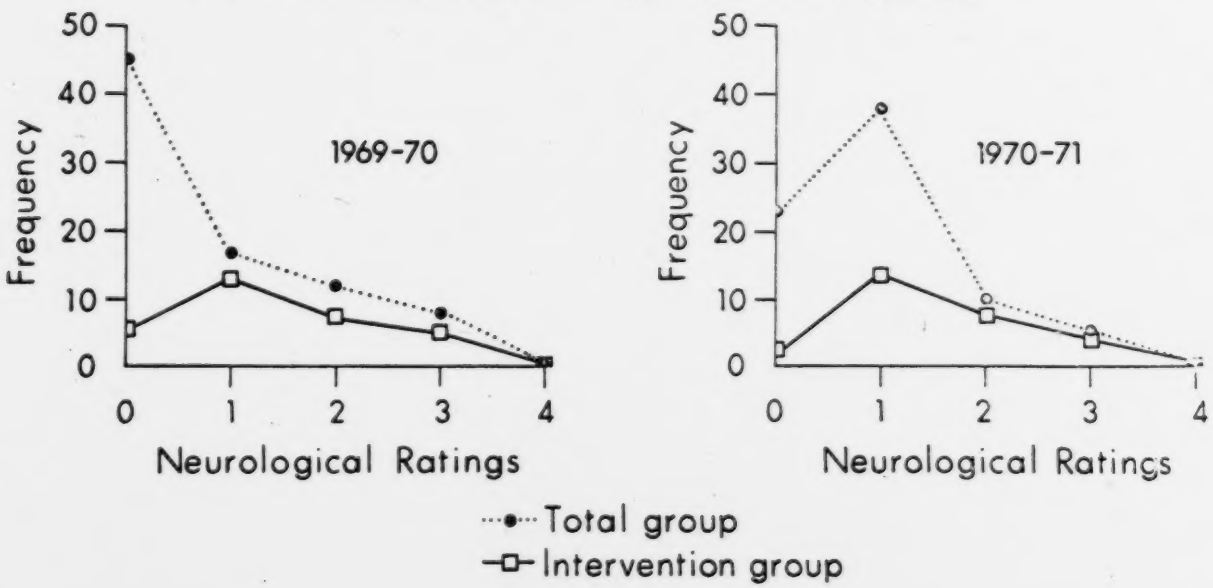


Figure 15

PROFILE OF NEUROLOGICAL FUNCTIONS
Total Group: 1969-70 and 1970-71*

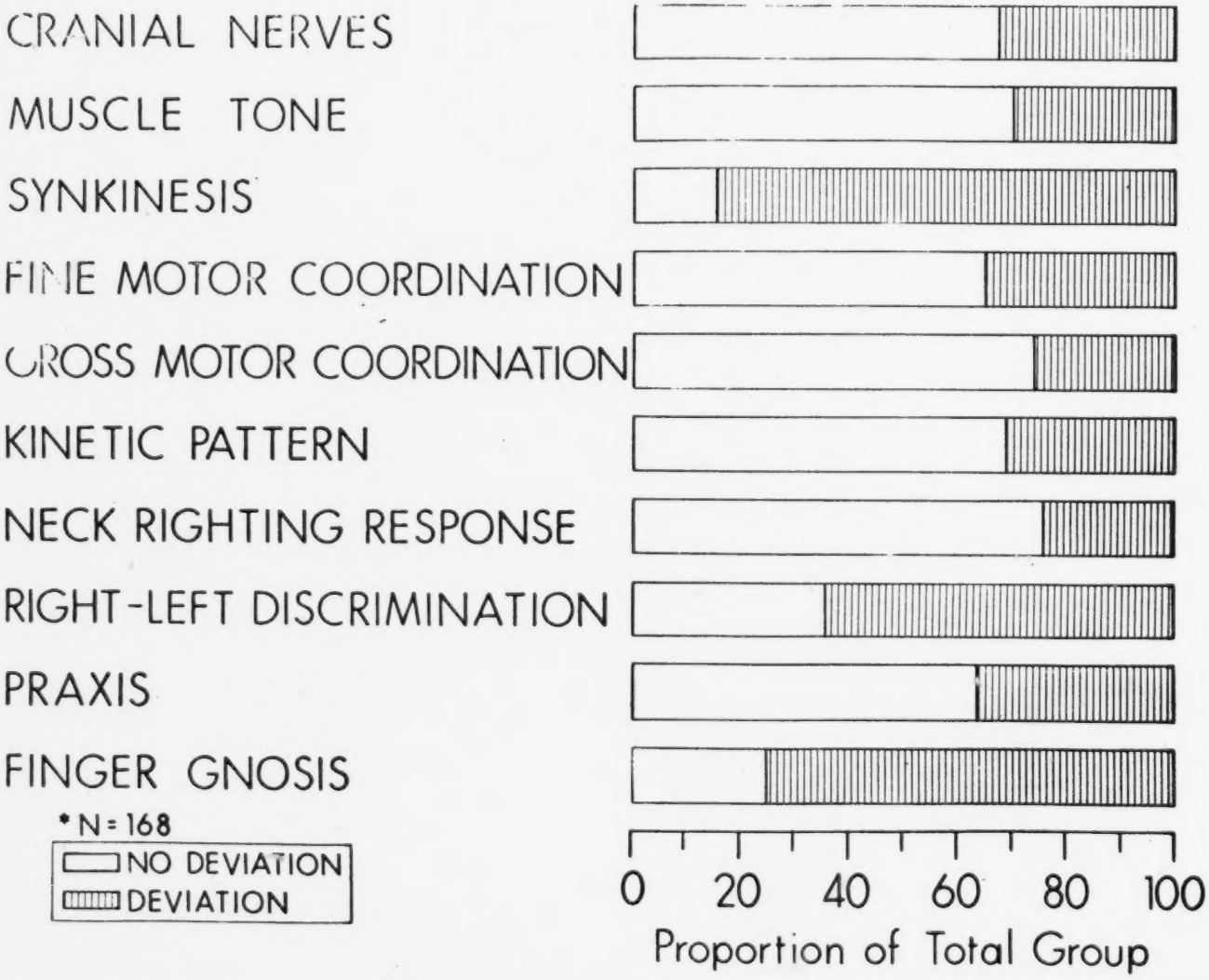


Figure 16

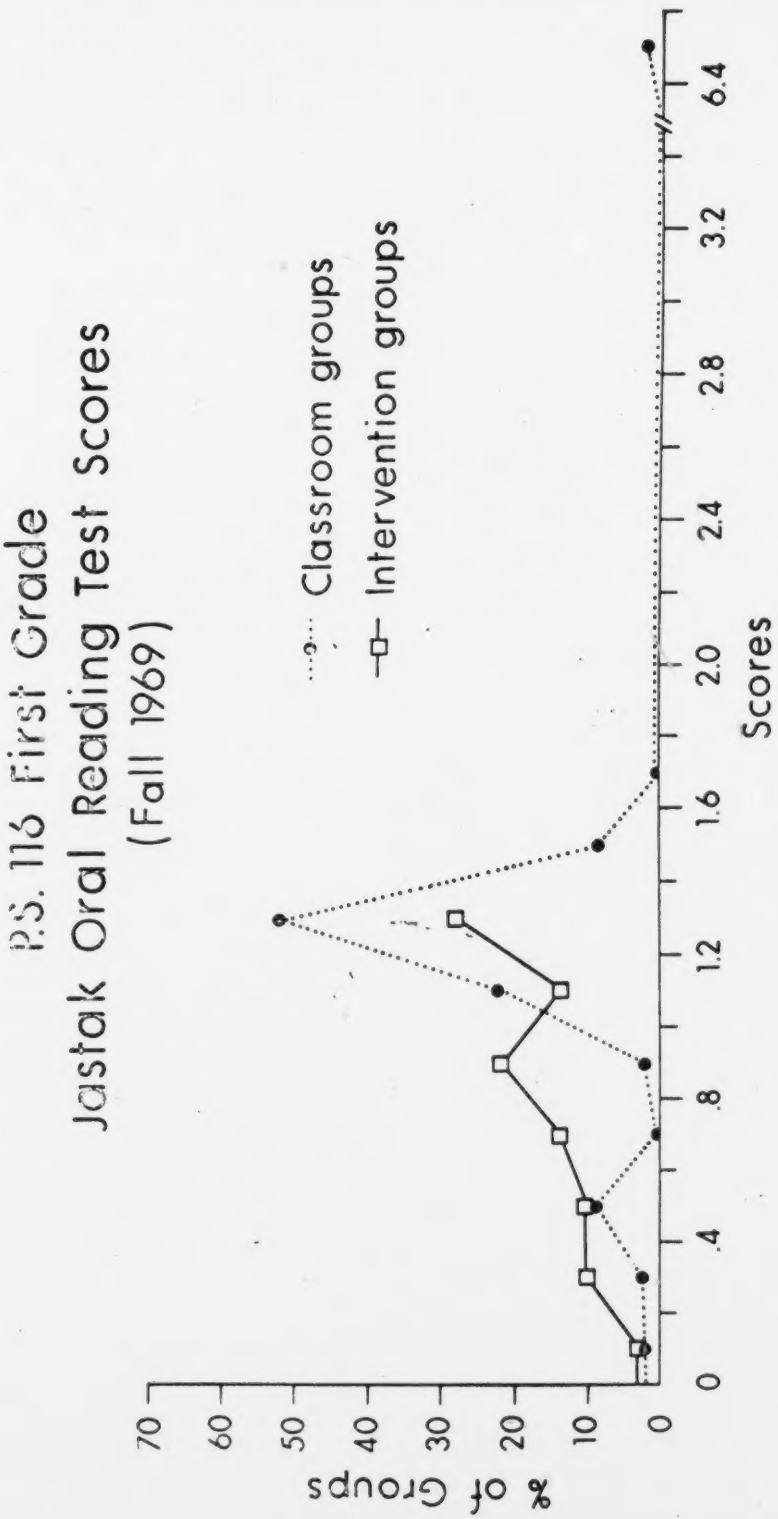
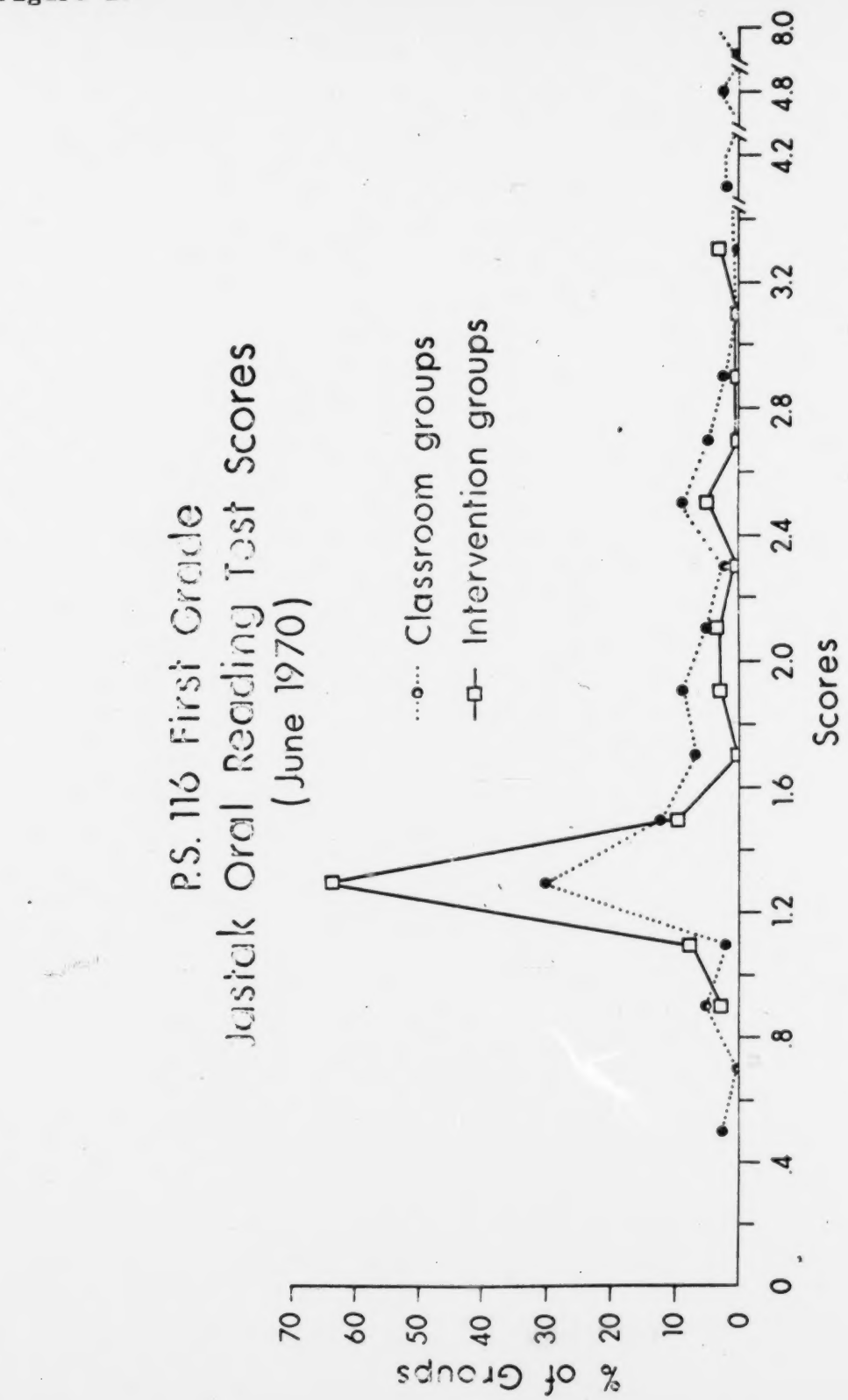

P.S. 116 First Grade
Jastak Oral Reading Test Scores
(Fall 1969)
Classroom groups
Intervention groups
% of Groups
70
60
50
40
30
20
10
0
0
.4
.8
1.2
1.6
2.0
2.4
2.8
3.2
6.4
Scores

Figure 17


P.S. 116 First Grade
Jastak Oral Reading Test Scores
(June 1970)
Classroom groups
Intervention groups
% of Groups
70
60
50
40
30
20
10
0
0
.4
.8
1.2
1.6
2.0
2.4
2.8
3.2
4.2
4.8
8.0
Scores

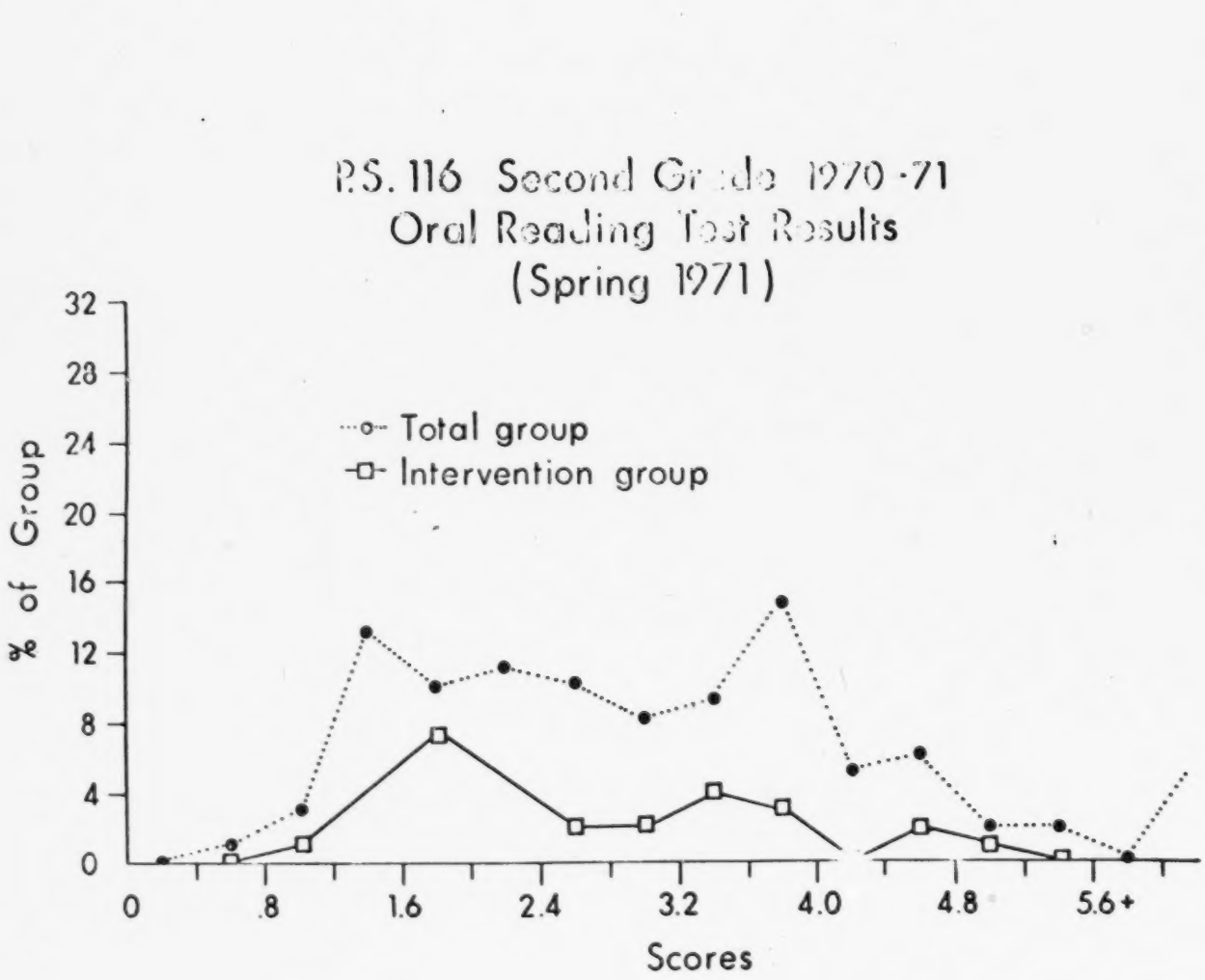

P.S. 116 Second Grade 1970-71
Oral Reading Test Results
(Spring 1971)
Total group
Intervention group
% of Group
32
28
24
20
16
12
8
4
0
0
.8
1.6
2.4
3.2
4.0
4.8
5.6+
Scores

Figure 18

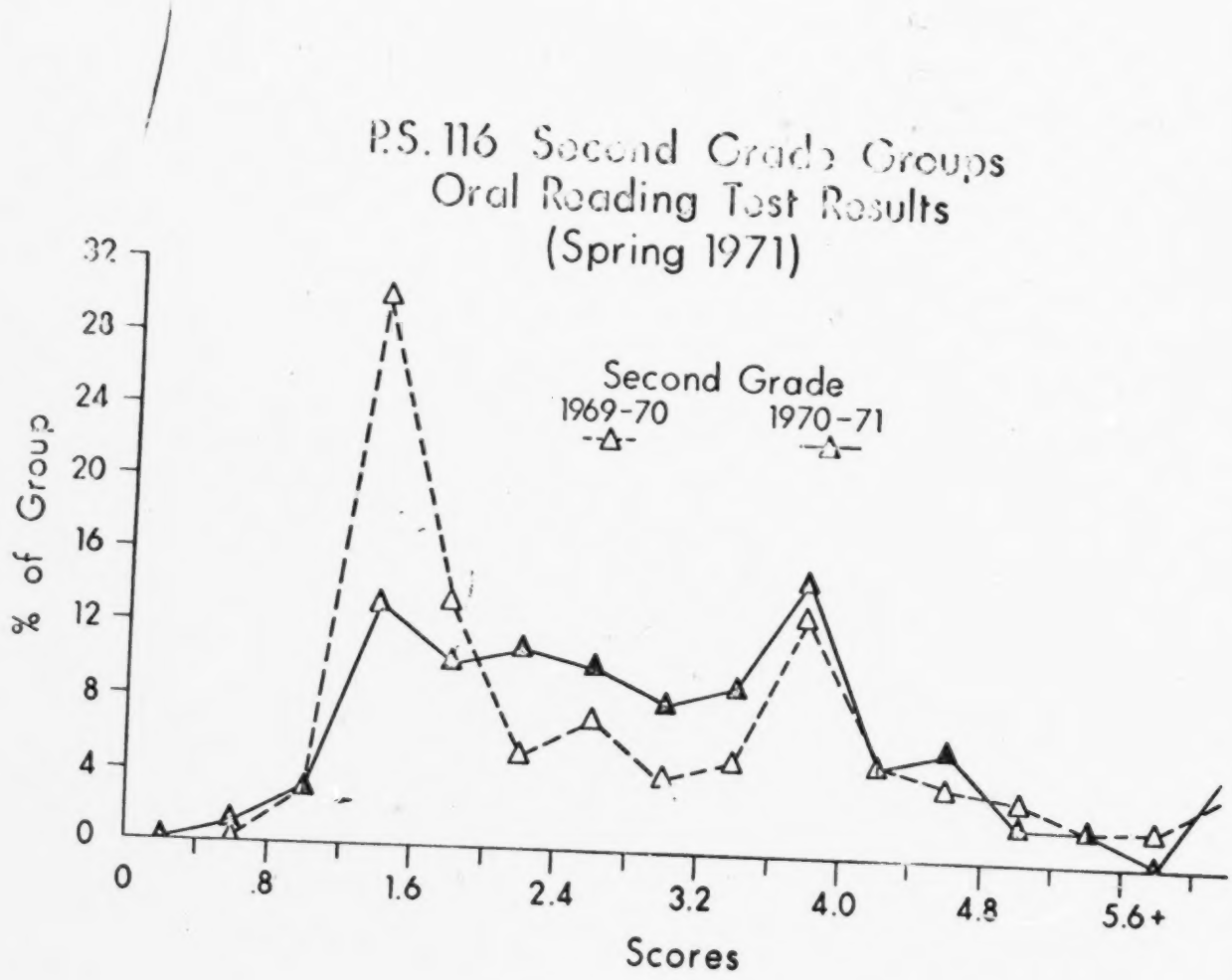

P.S. 116 Second Grade Groups
Oral Reading Test Results
(Spring 1971)
Second Grade
1969-70
1970-71
% of Group
32
28
24
20
16
12
8
4
0
0
.8
1.6
2.4
3.2
4.0
4.8
5.6+
Scores

Figure 19

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